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A new species of *Platyptilia* Hübner, 1825 (Lepidoptera, Pterophoridae) from Europe

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Abstract. *Platyptilia galicicaensis* **sp. n.** (Pterophoridae) is described. The species is found in the Republic of Macedonia, Ohrid, Galičica National Park. All specimens were collected around *Helichrysum zivojini* Černjavski & Soska, 1940 or *H. stoechas* (L.) Moench, 1794 (Asteraceae); one or both of these plants is probably the host plant of the new species.

Introduction

At the end of June 2014 we made an entomological expedition to Galičica National Park, Republic of Macedonia, mainly to investigate the microlepidoptera. In the first days of field work we observed a *Platyptilia* species (Pterophoridae) in large numbers around plants of *Helichrysum* Mill. (Asteraceae). As larvae of another species of *Platyptilia*, *P. tesseradactyla* (L., 1761), have also been recorded from *Helichrysum* (Hofmann 1896; Hannemann 1977) although they feed on *Antennaria dioica* (L.) (also Asteraceae) (Gartner 1862; Hofmann 1896; Huggins 1939; Beirne 1954; Gozmány 1962; Hannemann 1977; Buzsko 1986) in Scandinavian and Baltic countries, including Sweden, the type locality of *P. tesseradactyla* (Gielis 2003), and Finland, where the first author has reared *P. tesseradactyla* from *Antennaria dioica*, we wondered whether the specimens we observed belonged to this species. However, the Macedonian specimens externally resembled *P. gonodactyla* (Denis & Schiffermüller, 1775) or *P. calodactyla* (Denis & Schiffermüller, 1775) rather than *P. tesseradactyla*. As we were unable to find the known host plants of *P. gonodactyla* (*Tussilago* L., Asteraceae) and *P. calodactyla* (*Solidago* L., Asteraceae) in the locality where the unidentified *Platyptilia* species occurred, we decided to collect some specimens in order to clarify the species' status.

The genus *Platyptilia* Hübner, 1825 contains seven known species in Europe: *P. tesseradactyla*, *P. farfarellus* Zeller, 1867, *P. nemoralis* Zeller, 1841, *P. gonodactyla*, *P. calodactyla, P. iberica* Rebel, 1935 and *P. isodactylus* (Zeller, 1852). Here a new species, *P. galicicaensis* sp. n., is described. The new species is closest in appearance to *P. gonodactyla* and *P. calodactyla.* Both of these species have several junior synonyms. These were investigated and type specimens were examined by Arenberger (1988); the neotypes are in the Natural History Museum, Vienna (NHMW). In addition to the seven species that occur in Europe, the type specimens of *P. chondrodactyla* Caradja, 1920 and *P. kozanica* Fazekas, 2003 were also examined.

The genus *Platyptilia* is distributed in the Holarctic, Neotropical, Afrotropical and Indo-Australian Regions. Larvae of *Platyptilia* are Asteraceae feeders (Hofmann 1896; Barnes and Lindsey 1921;

Schwarz 1953; Gielis 1996). The new species exhibits typical characters of *Platyptilia* as given in the diagnosis of the genus (Gielis 1996) such as the well-developed costal triangular spot on the forewing, forewing vein R1 present, and the third lobe of the hindwing with a centrally placed scale-tooth. The new species was recorded for the first time at the end of June 2014 and again at about the same time in 2015 in Galičica National Park, near the town of Ohrid, Republic of Macedonia. Specimens were netted around *Helichrysum* plants at 1450 m a.s.l. in the evening just before sunset.

Material and methods

The species examined for comparative purposes are *Platyptilia chondrodactyla*: 1 ♂, Lectotype, 1 ♀, Allotype, both in coll. "Courtesy, the "Grigore Antipa" National Museum of Natural History", Bucharest, Romania; *Platyptilia kozanica*: 1♀, Holotype; *Platyptilia gonodactyla*: 19♂, 10♀, in coll. J. Junnilainen; *Platyptilia calodactyla*: 24♂, 15♀, in coll. J. Junnilainen; *Platyptilia tesseradactyla*: 19♂, 11♀, in coll. J. Junnilainen; *Platyptilia farfarellus* 2♂, in coll. J. Junnilainen; *Platyptilia nemoralis* 1♂, 1♀, in coll. J. Junnilainen; *Platyptilia isodactyla* 2♂, 2♀, in coll. J. Junnilainen.

All specimens of *P. galicicaensis* sp. n. were captured with nets late in the evening just before darkness when specimens were active around *Helichrysum* vegetation. Specimens were stored alive in glass vials and later killed in a freezer and then immediately spread. Later, dry specimens were labelled with the exact collecting data. Then the genitalia were dissected and first preserved in glycerol. After determination and comparative work under an Olympus VMZ 20–80X microscope, the genitalia were mounted on glass slides with euparal following the procedure of Robinson (1976). Later, dry genitalia slides were photographed with a Leica DM1000 microscope and an integrated Leica DF295 digital camera. Original images were cleaned and edited with Adobe Photoshop v. 11.0. The camera system used for images of the adult was a Nikon D800 with a Micro Nikkor 105 mm 1:2.8 D objective and three flash heads. The camera was moved between shots with a Cognisys Stackshot focussing rail. Zerene Stacker v. 1.04 and Adobe Lightroom 6.6 were used for processing the photos; 36 shots were combined in each photo stack.

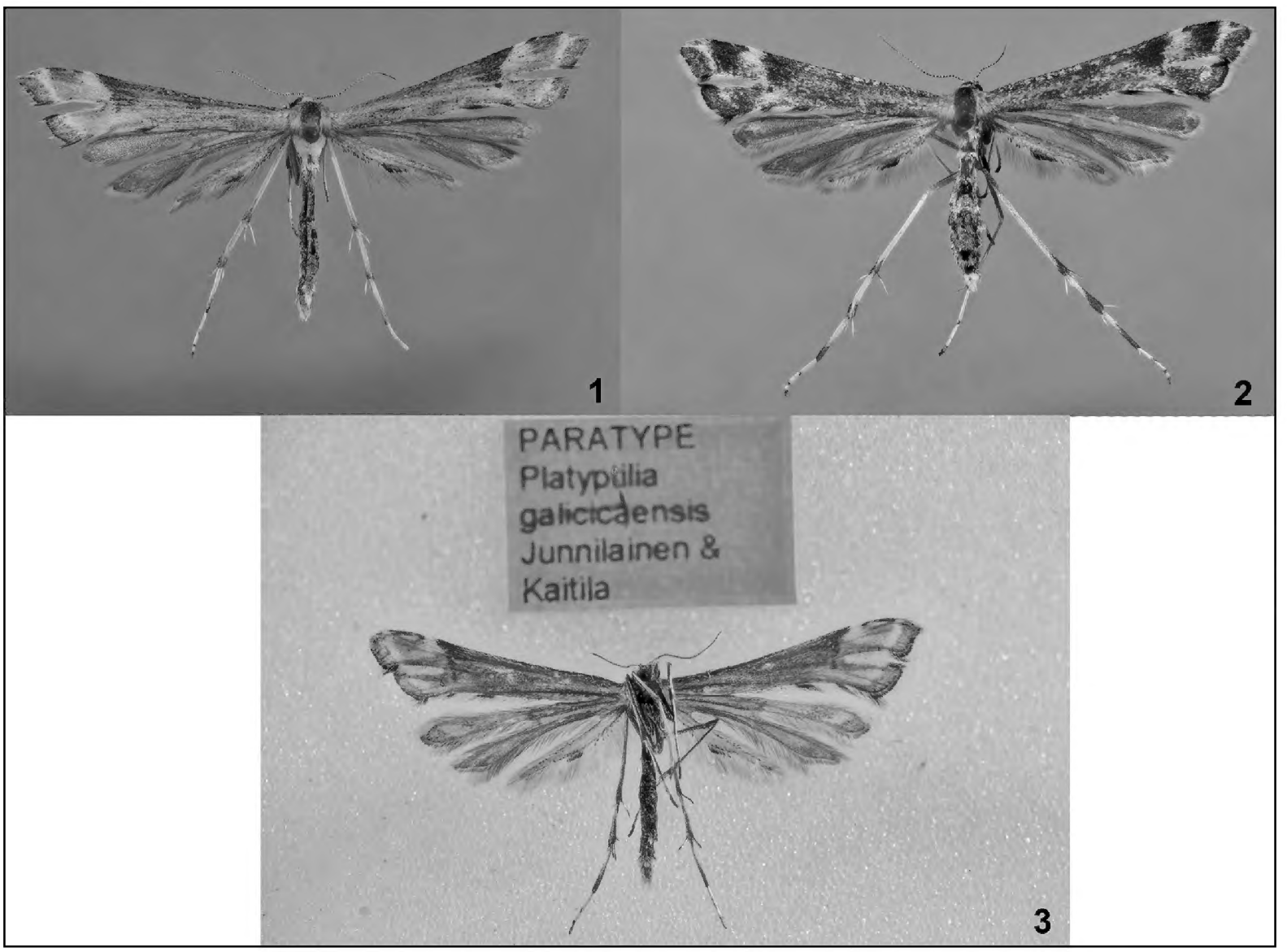
For the DNA analyses, one leg was removed from a dried specimen and moved to a lysis plate with 100% ethanol. A sample identification number MM24208 was given to the specimen. The sample was sent in a lysis plate to the Canadian Centre for DNA barcoding, Ontario, Canada, through the Finnish Barcode of Life campaign. DNA extraction, amplification, and sequencing of the barcode region of the mitochondrial cytochrome oxidase I (COI) gene (658 base pairs) were carried out successfully following protocols by deWaard et al. (2008). The specimen's taxonomic and collection data, voucher image, COI sequence and GenBank accession number are available in the BOLD database (http://www.barcodinglife.org/) through the public dataset DS-PLATYPEU.

Taxonomy

Platyptilia galicicaensis sp. n.

http://zoobank.org/899F28A1-0FD6-4CCA-892E-7A597009B9F4

Type material. Holotype: ♂, Macedonia, Ohrid, Galičica National Park, Old Ski Center Oteshevo 1450 m a.s.l., 40.980ºN; 20.860ºE, 26.vi.2014. J. Junnilainen leg. & coll. with red label "HOLOTYPE of *Platyptilia galicicaensis* Junnilainen & Kaitila". - Paratypes 16♂, 7♀: 1♂, 3♀ same locality and data as holotype, 1♀

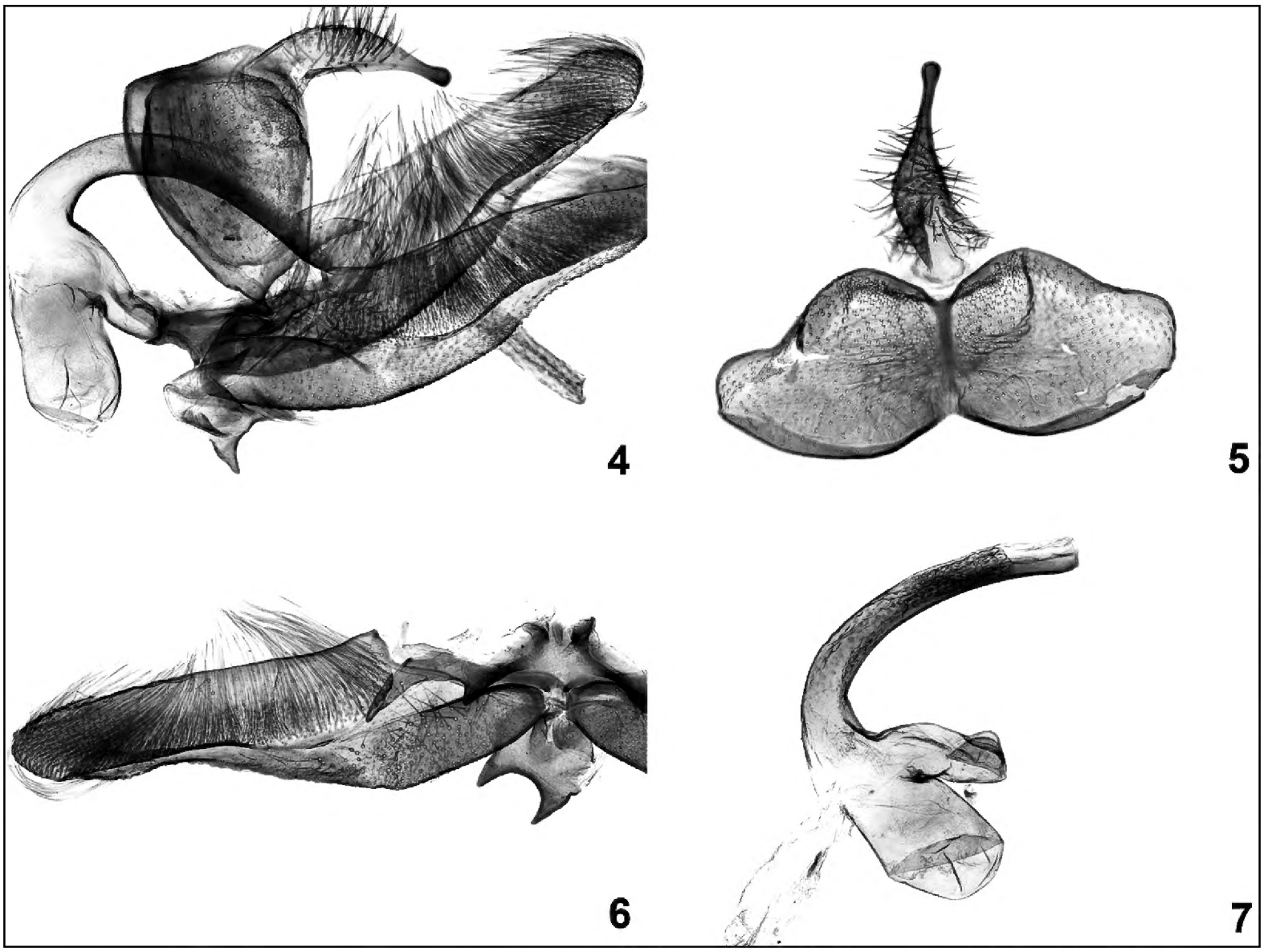


Figures 1–3. *Platyptilia galicicaensis* sp. n.: **1.** male holotype; **2.** female, paratype; **3.** male, paratype, underside.

with label Gen. Prep. No: GPJJ201604 and 1♀ with green label DNA sample 24208 Lepid phyl. and Gen. Prep. No: GPJJ201705; 8♂, 3♀ same locality as holotype but dates 3♂ 24.vi.2014, 2♂ genitalia preserved in glycerol; 1♂ 25.vi.2014 with label Gen. Prep. No: GPJJ201607; 2♀ 28.vi.2014; 3♂, 1♀ 14.vi.2015, 1♂ with label Gen. Prep. No: GPJJ201602; 2♂ 15.vi.2015; same data as holotype 4♂ except J-P. Kaitila leg. & coll.; same data except dates 1♂ 24.vi.2014 and 1♂, 1♀ 25.vi.2014. All paratypes with red labels "PARATYPE of *Platyptilia galicicaensis* Junnilainen & Kaitila".

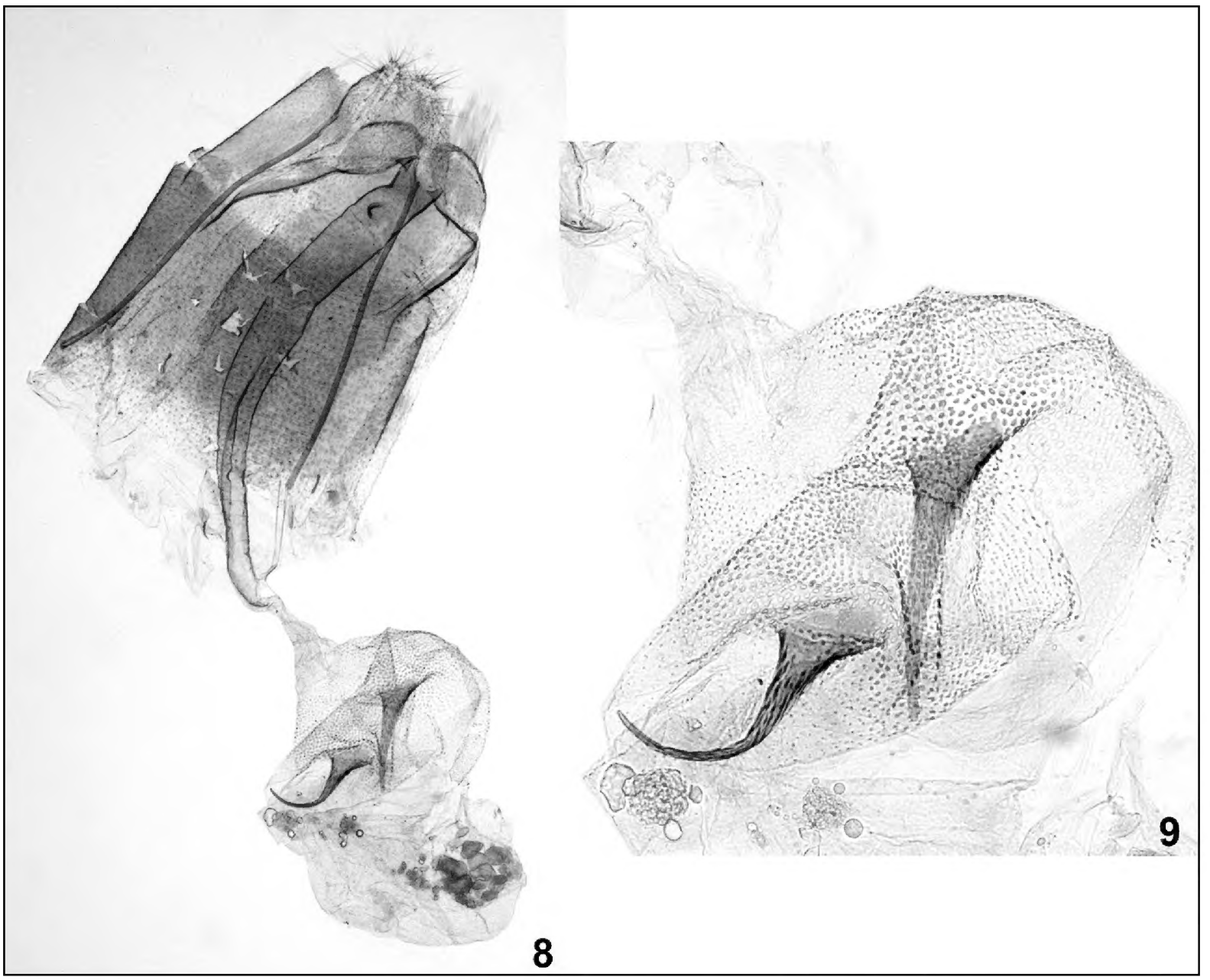
Deposition of types. The holotype of *Platyptilia galicicaensis* sp. n. is deposited in the private collection of J. Junnilainen. All paratypes of *P. galicicaensis* sp. n. are deposited in the private collections of J. Junnilainen & J-P. Kaitila. The type specimens can be borrowed by request through the Finnish Museum of Natural History, University of Helsinki or directly from the authors.

Description. Adult (Figs 1–3). Based on the holotype ♂ and 23 paratypes (16 ♂ and 7 ♀). Wingspan 19.5–25.5 mm. Labial palpus porrect, apex slightly turned down, twice as long as diameter of eye, covered with white, brown-tipped scales. Antenna relatively short, less than half length of forewing, slightly ciliate along its length, upper surface mottled with white and brown groups of scales, lower surface unicolorous pale brown, upper surface of scape and pedicel covered with scales of various colours, usually white or pale brown but sometimes even entirely brown, lower surface of scape and pedicel consistently more whitish. Head, thorax and tegula covered with white, brown-tipped scales, frons pure white. Ground colour of forewing ochreous-white mixed with grey scales,



Figures 4–7. *Platyptilia galicicaensis* sp. n., male genitalia: **4.** male genitalia, lateral view (GPJJ201607); **5.** unrolled tegumen with uncus; **6.** valva with saccus and anellus; **7.** phallus.

costa dark brown, female clearly darker than male. Base of cleft of forewing lobe almost reaching well-developed dark brown costal triangular spot. Pre-apical transverse white line distinct on both lobes. Termen of 1st lobe blunt, apex somewhat rounded; 2nd lobe with dark brown costal and dorsal spots connected to dark brown termen. Fringe white, with slightly fuscous at apex and termen of both forewing lobes; dorsum with three dark brown scale-teeth, 1st at 2/3 from base, 2nd below base of cleft and 3rd close to termen. Underside of forewing fuscous with sparse white scales along costa and both lobes mainly ochreous medially, ochreous colour reaching costa on 1st lobe at base of cleft, ochreous area on 2nd lobe divided by fuscous scales along Cu1 vein. Triangular costal spot, pre-apical costal spot, termen and two scale-teeth on dorsal margin dark brown. Hindwing fuscous, 3rd lobe with dark brown dorsomedial scale-tooth and row of dark brown scales in basal half. Fringe on 1st and 2nd lobes with two types of scales, shorter and fuscous scales cover basal half of fringe, long and whitish hair-scales cover distal half of fringe, fringe in 3rd lobe fuscous. Underside of hindwing fuscous except 1st lobe pre-apically ochreous and 3rd lobe distinctly paler with dark brown scales along both margins, dorsomedial scale-tooth dark brown. Fringe of hindwing lobes dorsally fuscous. Abdomen speckled with white and brown scales. Legs ochreous-white. Femur and tibia of foreleg brown, inner surface of midleg brown. Hindleg ringed brown around tibial spurs, distal half of 1st tarsomere fuscous, tarsomeres 2–4 fuscous distally, 5th tarsomere brown.



Figures 8–9. *Platyptilia galicicaensis* sp. n.: **8.** female genitalia (GPJJ201604); **9.** corpus bursae with a pair of signa.

Male genitalia (Figs 4–7). Five specimens examined. Uncus skittle broad basally with numerous setae, narrowing distally, with rounded apex, slightly curved towards valva. Tegumen a broad subovval plate, anterior margin with broad obtusely V-shaped cleft with both sides rounded, lateral margins rounded, posterior margin with broad medial cleft, both sides medially concave. Valva symmetrical, parallel-sided, 4× longer than wide, with numerous, long setae, apex rounded. Sacculus extending nearly to apex of valva, basal third broad, parallel-sided, medial third tapering to narrow apical third. Saccus a broad quadrangular plate, anterior margin broadly U-shaped. Anellus arms relatively stout and strongly sclerotized, strong lateral projection 1/3 from base, apical half gradually tapered to digitate apex. Phallus strongly curved throughout its length, basally inflated with sub-basal process, distal part tube-like slightly tapered towards blunt apex, large group of spinule-like cornuti in vesica.

Female genitalia (Figs 8–9). Two specimens examined. Papillae anales oval, with few setae. Apophyses posteriores 2× longer than 8th tergite. Apophyses anteriores short, broadening basally. 8th sternite consisting of pair of oval plates just posteriad of ostium bursae. Ostium bursae cup-shaped. Antrum tubular, sclerotized part 8× longer than membranous part of ductus bursae, posterior half almost parallel-sided, anterior half slightly tapering towards bursa. Membranous part of ductus bursae posteriorly narrow then widening towards corpus bursae. Corpus bursae roundish

Figure 10. Habitat of *Platyptilia galicicaensis* sp. n. Macedonia, Galičica National Park.

with pair of hook-shaped signa. Signa basally wide, basal half strongly narrowing toward spinous and strongly curved distal half. Area surrounding signa base spiculate.

Variation. Females are overall much darker than males.

Diagnosis. Externally the new species differs from the most similar looking species in having a narrower, brownish forewing and the apex of the 1st lobe is more rounded. Also, transverse line near the forewing apex is white and more distinct. The most similar looking species, *P. gonodactyla* and *calodactyla*, have broader forewings and a sharper apex to the 1st lobe. The ground colour of *P. gonodactyla* is more greyish while that of *P. calodactyla* is paler yellowish with more reddish brown markings. The transverse line near the forewing apex is more yellowish in both those species. The male genitalia of the new species differ from those of its relatives in having a more parallel-sided valva, the tegumen having the posterior margin medially concave, the broader

Figure 11. *Helichrysum* vegetation in Galičica National Park.

and quadrangular saccus, the spine on the anellus arm located closer to the base, at 1/3 from base. The female genitalia differ in having a more cup-shaped ostium bursae, the sclerotized part of the antrum is 8× the length of the membranous part of the ductus bursae compared with 7× in *P. gonodactyla* and 6× in *P. calodactyla*. Also, the signa are more curved and narrowly hook-shaped than in its nearest relatives which have broader, straighter, and more horn-shaped signa.

Distribution. Only known from the type locality, Galičica National Park, Ohrid, Republic of Macedonia.

Biology (Figs 10–11). Unknown, although it is expected that at least one or both *Helichrysum* species, *H. zivojini* and *H. stoechas,* which grow at the type locality are host plants of *P. galicicaensis* because the type series was captured near those plants.

Etymology. The name of the new species is dedicated to the famous Galičica National Park.

Discussion

Although the genus *Platyptilia* has a Holarctic distribution, we were unable to find any valid name for this new species. We are also aware that both *P. gonodactyla* and *P. calodactyla* have several junior synonyms available but none of these was described from the Balkan region or its eastern neighbouring regions where the new species might also occur. Neotypes were selected for both *P. gonodactyla* and *P. calodactyla* by Arenberger (1988), who illustrated the genitalia of both sexes. There is also one *Platyptilia* species quite recently described from central Turkey by Fazekas (2003), *Platyptilia kozanica*, but it clearly differs from our new species in having the triangular costal spot divided into two parts and in the female genitalia the antrum is much shorter, about 6× the length of the membranous part of the ductus bursae. We were also able to examine the lectotype and allotype of another species described from Turkey, *P. chondrodactyla*. It is a rather large species with a wingspan of 31 mm and almost unicolorous ochreous-brown without any distinct markings on the forewing, and the hindwings are ochreous coloured.

We sequenced the DNA barcode region of the new species to reduce the risk of creating a new synonym for an existing species. The DNA barcode sequence (sample ID MM24208) in BOLD (www.barcodinglife.org) shows a clear difference from all other species of *Platyptilia* and constitutes a unique BIN (BOLD: ACW2728). The nearest species is *Platyptilia johnstoni* Lange, 1940, a North American species differing by a minimum K2P distance of 4.87%. The next closest are *Platyptilia gonodactyla* with 5.12%, *P. calodactyla* with 5.84%, *P. nemoralis* with 6.14%, and *P. tesseradactyla* with 6.83%. At the moment 29 species of *Platyptilia* have barcode data in BOLD, some of which are likely to be undescribed with an interim OTU name. Usually *Platyptilia* species have no or little intraspecific variation in barcodes, even when samples selected are geographically far from each other. For example, in all barcoded *P. gonodactyla*, including over 40 specimens, variation is less than 0.5% in BOLD. Because the barcode differences are so large between the new species and its nearest neighbours, it is clear that our new *Platyptilia* species has not been previously barcoded, not even amongst the several barcoded but un-named *Platyptilia* species.

The two *Helichrysum* species around which specimens of *Platyptilia galicicaensis* were flying, *H. zivojini* and *H. stoechas* grow in close association. Therefore it is difficult to determine which plant species is the actual host plant or whether both are used. Further studies are needed to confirm the host plant and describe the immature stages. Usually the ideal time to obtain larvae and pupae of *Platyptilia* is in late spring or early summer just before or after pupation when feeding signs of larvae are still visible on the host plant.

Galičica is a mountain situated along the border between the Republic of Macedonia and Albania. There is a National Park on the Macedonian side of the mountain, situated between the two largest lakes in the Republic, Lake Ohrid and Lake Prespa. It stretches over an area of 227 square kilometres (88 mi²). Galičica National Park is characterized by a high incidence of relict and endemic plants. One of these is *Helichrysum zivojini*, one of the possible host plants of *P. galicicaensis*. There are also some lepidopterological traditions in Galičica National Park, for example the famous Austrian entomologist Dr. Josef Wilhelm Klimesch spent summers in the town of Ohrid in the middle of the last century and collected numerous Lepidoptera in the Galičica Mountain Range. Later several other entomologists and specialists in Microlepidoptera and Macrolepidoptera also visited the area and several new species of Lepidoptera were described based on material collected from there. Recently the Park has become an SEL (Societas Europaea Lepidopterologica) study area.

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